भारतीय मानक
Indian Standard

IS 9168 : 2018

स्वचल वाहन — हवा भरे टायरों के लिए रबड़ के फ्लैप — विशिष्टि

(दूसरा पुनरीक्षण)

Automotive Vehicle — All Rubber Flaps for Pneumatic Tyres — Specification

(Second Revision)

ICS 83.160.10 : 43.040

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Automotive Tyres, Tubes and Rim Sectional Committee, TED 7

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rim Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1979 and revised in 1991. The revision of this standard has been taken based on the technological developments taken place in the field of flaps for automotive vehicles. This standard has been undertaken after due consideration of the practices prevalent in the industry. Following are some of the salient features of this standard:

a) More clarity has been made in the construction clause.
b) Valve hole additional thickness clause has been added in line with current practices in industry.
c) Marking clause has been made more explicit by adding identification scheme for month and year of manufacturing and additional example given for clarity and better understanding.
d) More details provided in clauses of hardness and retention of properties on ageing for clarity.

The dimension of flaps given in this standard are generally applicable to tyres for trucks, buses, light trucks and off-the road vehicles. For these types of tyres reference to the following Indian Standard may be made:

IS 15636 : 2012	'Automotive vehicles — Pneumatic tyres for commercial vehicles — Diagonal and radial ply —Specification (*first revision*)'

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numeric values (*revised*)'. The number of significant places retained in the rounded off values should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLE — ALL RUBBER FLAPS FOR PNEUMATIC TYRES — SPECIFICATION

(Second Revision)

1 SCOPE

This standard specifies the dimensions, general requirements and methods of checking the physical test requirements of all rubber flaps used with pneumatic automotive tyres.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
3400	Methods of test for vulcanized rubbers
(Part 1) : 2012 / ISO 37 : 2012	Tensile stress-strain properties (*third revision*)
(Part 2) : 2003 / ISO 48 : 1994	Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD) (*third revision*)
(Part 4) : 2012/ ISO 188 : 2011	Accelerated aging (*second revision*)
15636 : 2012	Automotive vehicles — Pneumatic tyres for commercial vehicles — Diagonal and radial ply — Specification (*first revision*)

3 DESIGN AND CONSTRUCTION

3.1 All rubber flaps shall be manufactured, using a suitable compound of natural rubber or synthetic rubber polymer base or a blend there of, to the design requirements (*see* **3.1.1** and **3.1.2**) and shall be of the endless type.

3.1.1 Flaps shall be suitable for tyre/rim/inner tube combinations, for which the minimum widths are given in Annex A.

3.1.2 The inner diameter of flap determined by measuring the circumference of the flap surface coming in contact with rim at centre region, using an inextensible tape, shall be more than the nominal rim diameter (that is nominal rim diameter code marked on the flap × 25.4 mm) but less than nominal rim diameter plus 25 mm. To determine thecircumference paste the inextensible tape (like 'ABRO tape' or '2123 tape' or similar material) in the inner surface, thencut the tape and measure the length of the tape using a measuring tape of least count 1.0 mm. Calculate the diameter by dividing the circumference so obtained by π. Each edge of the flap shall have thickness tapering to maximum 2.2 mm.

3.1.3 A valve hole shall be provided in each flap and shall be at least 12 mm diameter dependent on the tube valve stem. It shall be positioned, away from the joint in the vulcanized flap, at the center of the flap sectional width except where meant for fitment to rims having an off – central valve hole.

3.1.4 A working tolerance of ± 8 mm is allowed on the design location of the valve hole in a flap.

3.1.5 Around the valve hole additional thickness may be provided on the flap to prevent the flap from piercing into the valve slot on the rim. This may be provided in the form of additional thickness of rubber, layers of rubberized fabric and/or metal or plastic strips – the total thickness in the region shall be less than valve bent height of the tube that is used along with the flap.

4 DESIGNATION

Designation shall include the nominal rim diameter code and the flap width code (*see* Annex A).

Example:

A flap used for the nominal rim diameter size code 20 and having an overall width 153mm (Width code M) shall be designed as: 20M.

5 PHYSICAL TESTS AND OTHER REQUIREMENTS

5.1 Joint Adhesion Strength

5.1.1 *Moulded Flap*

As there is no joint in the moulded flaps, no need to test joint strength.

5.1.2 *Flap with Overlap Joint*

Where the joint is visible in a finished flap, the adhesion strength at the joint may be checked and shall be not less than 1.0 MPa width, when tested in accordance with the test procedure outlined in Annex B.

5.2 Hardness

The shore hardness of the unused finished flap before heat ageing shall lie between 45° and 65° when measured by Shore Type 'A' Durometer. The hardness shall be measured at or on test piece cut from centre of the flapas per test method IS 3400 (Part 2).

5.3 Retention of Properties on Ageing

The test piece having 'Type 1 dumb bell shape' shall be preparedfrom theflapaccording to IS 3400 (Part 1). Dumb bells of Type 1 punched directly from the flap from a portion having best possible flatness may also be used for testing. The dumb bells shall be subjected to ageing in an air oven at 1 000°C ± 20°C for 24 h according to IS 3400 (Part 4). The tensile strength and elongation before and after ageing shall as given below:

a) *Before heat ageing*:
   1) Hardness, Shore A : 45 to 65
   2) Tensile strength, kg/cm^2 : 90 *Min*
   3) Elongation at break, percent: *Min* 300

b) *After heat ageing at100°C for 24h (shall not vary more than)*:
   1) Change in hardness Shore A: –5 to 10 units
   2) Tensile strength, kg/cm^2 : + 15 percent to 50 percent
   3) Elongation at break : + 15 percent to 50 percent

Example:

If the original elongation at break percent is 400, the aged elongation should not vary more than (+)60 to (–)200.

6 MARKING

The flaps shall be permanently and legibly marked with the following:

a) Manufacturer's name or trade-name.
b) Flap size designation as in **4**.
c) Applicable tyre size designation(s) and rim combination(s) (optional).
d) Indication of month and year of manufacture as per scheme given in Annex C.

7 BIS CERTIFICATION MARKING

The product may also be marked with the Standard Mark.

7.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards

ANNEX A

(*Clauses* 3.1.1 *and* 4)

FLAP WIDHTS AND FLAP WIDTH CODES

A-1 Minimum widths of flaps and the corresponding width codes shall be as given in Table 1.

Table 1 Minimum Widths of Flaps and Flap Width Codes

(*Clause* A-1)

Sl No.	Flap Width Code	Nominal Tyre Section (Where Code not Used)	Flap Width *Min*
(1)	(2)	(3)	(4)
i)	K KM M	Marking optional	100 124 153
ii)	N RR V	Marking optional	176 207 225
iii)	– 18.00 – 21.00 – 24.00 – 26.5	To be followed by the nominal rim diameter size code	350 426 426 565

NOTES

1 Flap width codes are preceded by the nominal rim diameter size code.

Example — A flap of 153mm width and meant for fitment to a rim of nominal diameter code 20, such as B6.0 x 20, is designated as '20M'.

A flap of 426 mm width and meant for fitment to a rim of nominal diameter code 24 and for tyre having section width code 18.00 is designated as '18.00-24 426'.

2 Flap width shall be measured using a flexible tape, in its vulcanized shape, over that side of the flap which comes adjacent to the rim during use. The widths are the minimum acceptable widths for the tyre on the recommended or alternate rim sizes indicated in IS 15636.

ANNEX B

(*Clause* 5.1)

TEST FOR JOINT ADHESION STRENGTH

B-1 TEST PIECE

Test piece shall be prepared as per the method given in IS 3400 (Part 1), keeping the joint at the middle of the narrow portion of the dumb-bell pieces.

NOTE — If the dumb-bell test piece,when cut from the thickest portion of the flap, show some concavity at any of the two edges, the arithmetic mean width shall be taken in calculations.

B-2 TEST TEMPERATURE

The test piece shall be conditioned at 27 ± 2° C or at ambient temperature for a period of not less than 12h before being tested. The testing shall be carried out under ambient temperature condition or at 27 ± 2° C.

B-3 TEST PROCEDURE

B-3.1 Insert the ends of the test piece into the jaws of a tensile testing machine (sensitive enough to record with accuracy low values in particular). Take care that the tension is uniformly distributed over the cross section of the jaws. The lower jaw through which the load is applies shall be capable of a substantially constant rate of traverse at 200 mm/min. Record the breaking load in kilograms from the scale.

B-3.2 Testing shall be carried out on three test pieces of which at least two pieces shall be taken from the joint. The average of the readings shall be the final result for breaking strength of the joint per $6.0^{+0}_{+0.4}$ mm width.

B-3.3 The joint adhesion strength per centimeter width which is indicated in **5.1** shall be calculated from the formula:

Joint adhesion strength = $\frac{L \times 10}{W}$ kg/cm

where

L = breaking load of the dumb-bell strip, in kg; and

W = arithmetic mean width of the test piece, in mm.

ANNEX C

[*Clause* 6.1 (c)]

IDENTIFICATION SCHEME FOR MONTH AND YEAR OF MANUFACTURING

C-1 IDENTIFICATION SCHEME

C-1.1 Month of manufacture and year are engraved or printed as per scheme depicted in Fig. 1.

C-1.2 Month code circle and year to be engraved not more than 200 mm away from the valve

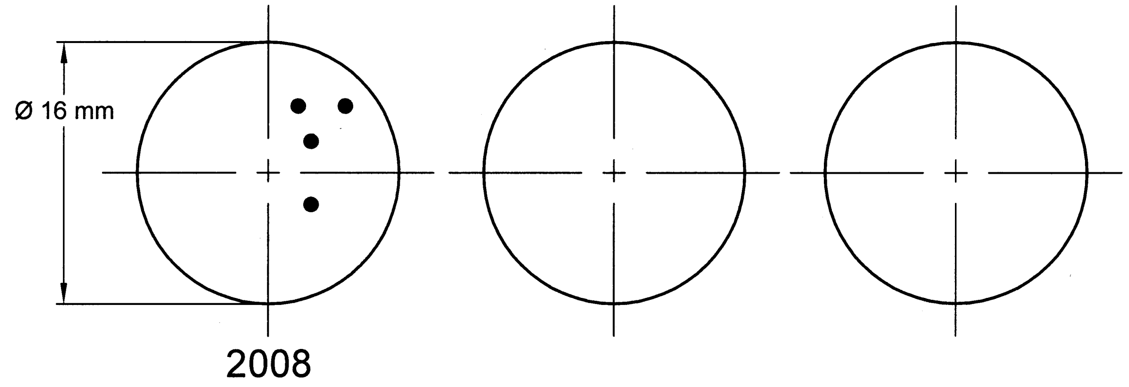
C-1.3 Each month should be identified by a punch marking of at least 0.5 mm diameter in the respective quarter.

C-1.4 After completing one year, fresh identification shall be started again for the next year with next circle.

C-1.5 After completing all the three circle, re-engraving can be done after masking the previous engraving/punch markings

C-1.6 The diameter of the circle given in Fig. 1 is the minimum requirement. Instead of circle square or rectangular shape is also acceptable.

C-1.7 Alternative method which clearly indicates the week and year or month and year of manufacturing is also acceptable.



NOTE — Identification for April 2008 depicted in the drawing above. However, the four dots can be in any quadrant.

FIG. 1 SCHEME OF MARKING MONTH AND YEAR ON FLAP

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